



Collider-Accelerator Department Worker Occupational Safety and Health Committee

Date: July 18, 2005
To: WOSH Committee and Guests
From: R. Savage/P. Sparrow
Subject: Minutes for 6/28/05 - WOSH Committee Meeting

Members: R. Akins, M. Bannon*, J. Beebe-Wang*, J. Carlson*, R. Conte, J. Cupolo, D. Derryberry*, F. Dusek, J. Guercio, J. Laster*, D. Lazarus, C. Liaw, B. Mullany, J. Nicolellis*, D. Oldham, S. Pontieri*, M. Sardzinski, R. Savage*, W. Shaffer, T. Shrey*, L. Snyderstrup, P. Sparrow, D. Steski*, F. Teich*, W. Venegas*, L. Vogt* and D. Weiss.
(* denotes not in attendance)

Guests: P. Cirnigliaro, R. Karol and E. Lessard

The primary focus of the meeting was a Human Performance presentation by E. Lessard. WOSH Committee Members were shown how (4) error precursors (Task demands, individual capabilities, work environment and human nature) can affect specific work tasks. It was explained that if workers discussed their critical work steps, anticipate error traps, foresee consequences, evaluate defenses and reviewed their operating experience prior to starting a task many of these errors would be avoided.

Peter Cirnigliaro identified that the new **S2 (Safety Solutions) Program** has been funded for FY05. It was explained that the program will mirror the P2 program with project submittals to a team that reviews and selects the project to be funded. Submittals are open to all projects with a health and safety improvement goal: training, signage & posting, equipment replacement, safer processes, PPE, worker incentives, safety awareness raising, etc. For FY05 we have \$20,000 in funds.

Please see the attached link for more details on the program. Please consider submitting proposal(s) yourself and also spread the idea around in your organization. This year, the deadline for submittals is **July 31, 2005**. In future years, the submittal cycle will follow the fiscal year more closely.

http://www.bnl.gov/esh/shsd/OHSAS/S2_homepage.asp

Question: A member asked if someone could investigate the UPS in building 1000P. The concern is that it appears there is an exposed terminal on the UPS.

Action: P. Sparrow was assigned to follow-up on this concern.

Question: A member asked what the status is for issuing a policy for working on 110 volt circuit breakers.

Action: T. Nehring stated that the C-AD policy for working on 110 volt circuit breakers is scheduled for release in mid July. In addition, he stated if anyone requires certain specifics in the mean time they should contact him.

Closing Meeting Comments: WOSH Committee Members were requested to discuss these issues with their staff during their regular group meeting.

Copy to:

Aronson, S.

Harrison, M.

Karol, R.

LaMontagne, S.

Lessard, E.

Lowenstein, D.

Ozaki, S.

Passarello, D.

Pile, P

Roser, T

Sandberg, J.

Tuozzolo, J.

Williams, P.

WOSH Committee Members



Fundamentals of Human Performance Improvement

Purpose of Human Performance (HU)



To minimize
the frequency
and severity
of events



Objectives

- ❖ **Why HU events occur**
- ❖ **Error-likely Situations & error precursors**
- ❖ **HU Models**
- ❖ **Jobsite tools**
- ❖ **Leadership practices**





Two Kinds of Error

Active Error ←



→ Latent Error

(leading to latent conditions)

Principles of Human Performance Management



- ❖ Humans are fallible
- ❖ Error is predictable
- ❖ Organization influences behavior
- ❖ Behaviors are reinforced
- ❖ Events are avoidable

Anatomy of an Event



Strategic Approach



1. Anticipate and prevent active error at the job-site.
2. Identify and eliminate latent organizational weaknesses.

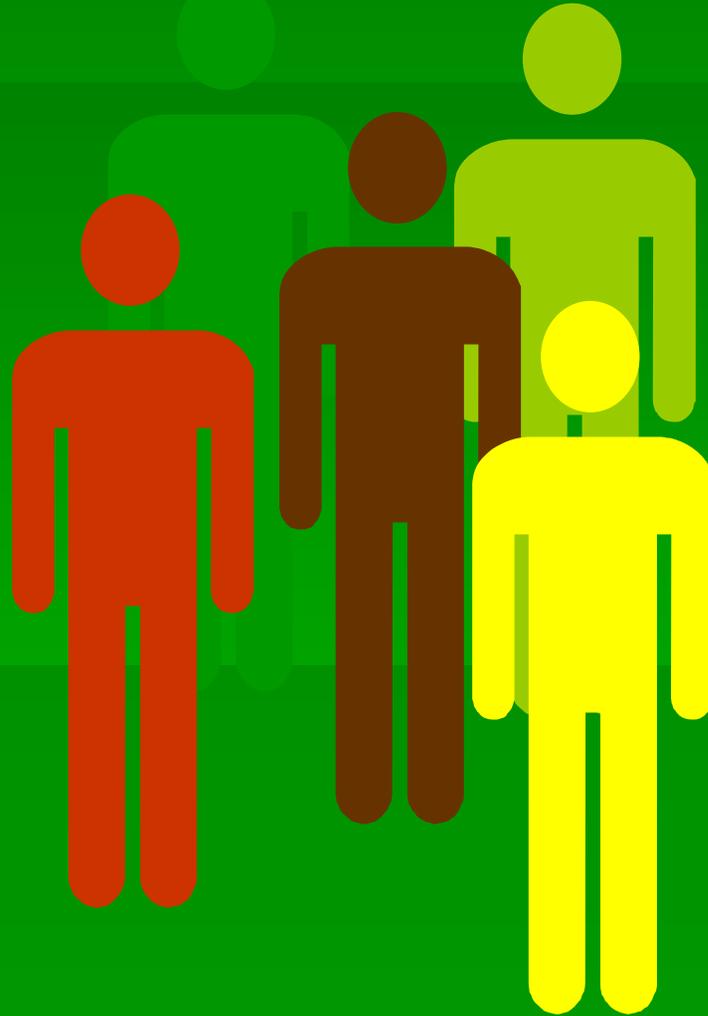
Essential Elements for Achieving Reliable Human Performance



- Organizational Attributes
- Process Contributors
- Individual Values and Behaviors



The Jobsite and The Individual





Traps of Human Nature



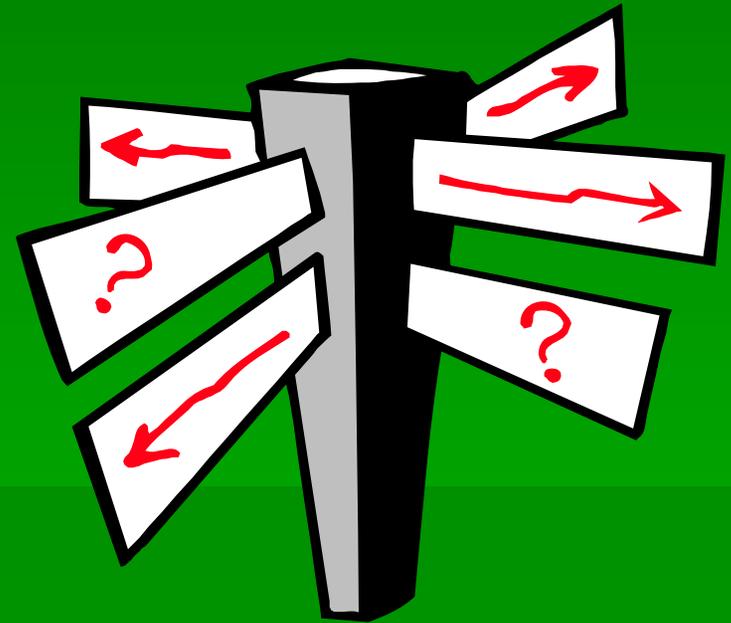
- ❖ Stress
- ❖ Avoidance of mental strain
- ❖ Inaccurate mental models
- ❖ Limited working memory
- ❖ Limited attention resources
- ❖ Mind set
- ❖ Difficulty seeing own errors
- ❖ Limited perspective
- ❖ Susceptible to emotion
- ❖ Focus on goal
- ❖ Fatigue



Error Precursors

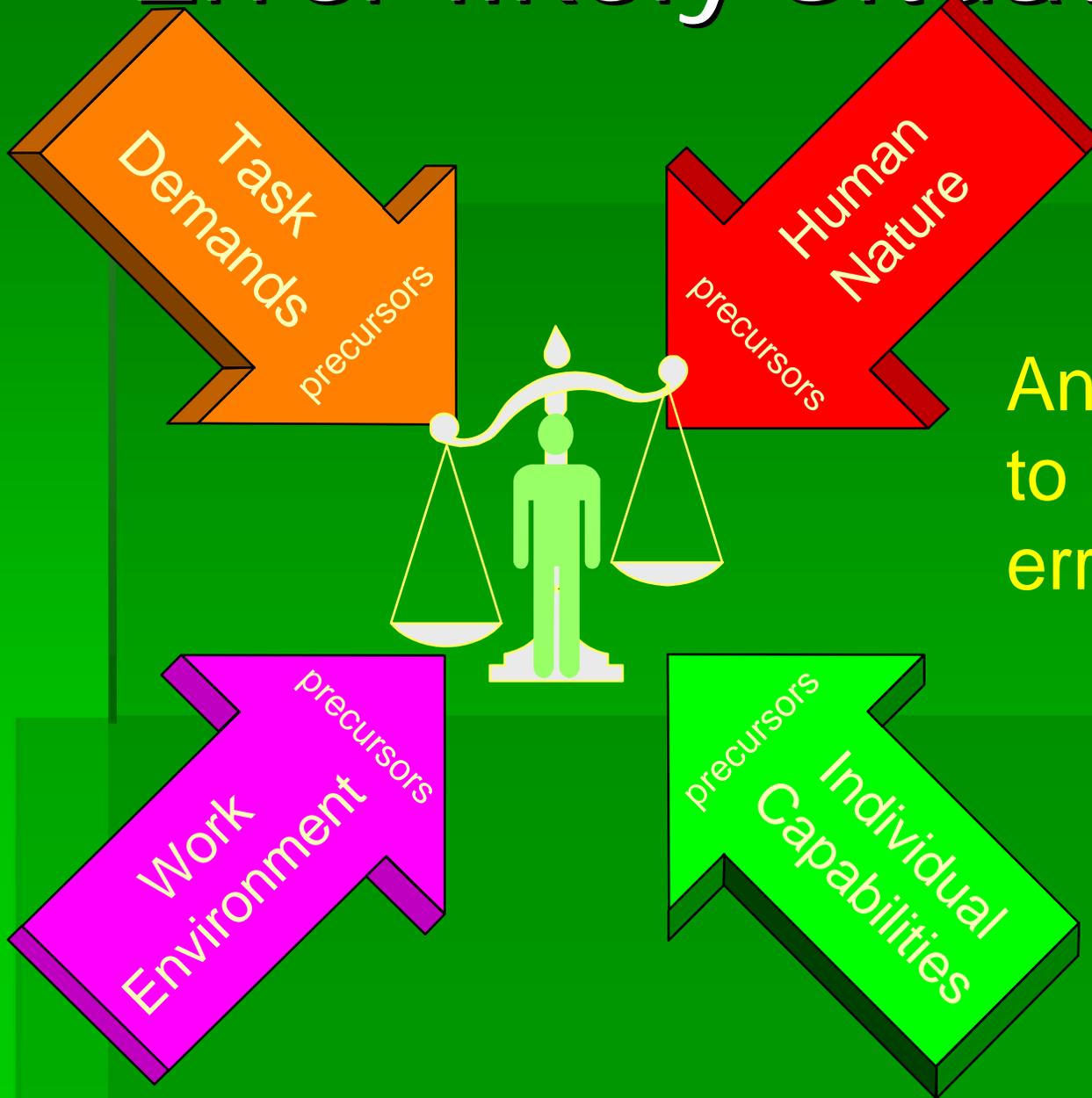


- ❖ Task Demands
- ❖ Work Environment
- ❖ Individual Capabilities
- ❖ Human Nature





Error-likely Situation

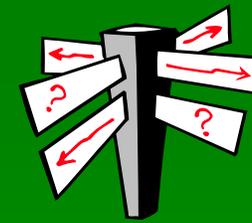


An error about to happen due to error precursors



Error Precursors

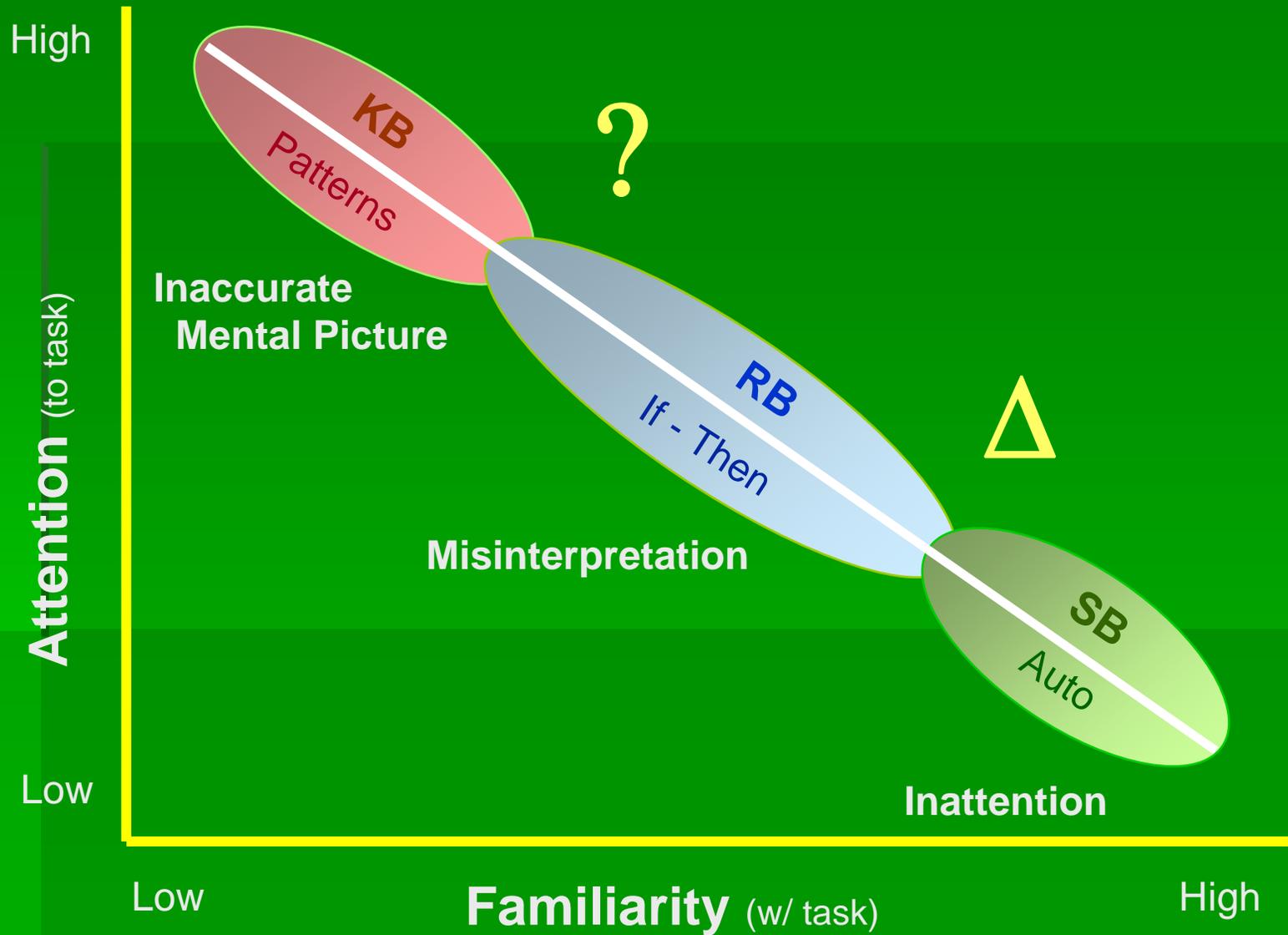
short list



Task Demands	Individual Capabilities
<ul style="list-style-type: none"> ▪ Time pressure (in a hurry) 	<ul style="list-style-type: none"> ▪ Unfamiliarity w/ task / First time
<ul style="list-style-type: none"> ▪ High Workload (memory requirements) 	<ul style="list-style-type: none"> ▪ Lack of knowledge (mental model)
<ul style="list-style-type: none"> ▪ Simultaneous, multiple tasks 	<ul style="list-style-type: none"> ▪ New technique not used before
<ul style="list-style-type: none"> ▪ Repetitive actions, monotonous 	<ul style="list-style-type: none"> ▪ Imprecise communication habits
<ul style="list-style-type: none"> ▪ Irrecoverable acts 	<ul style="list-style-type: none"> ▪ Lack of proficiency / Inexperience
<ul style="list-style-type: none"> ▪ Interpretation requirements 	<ul style="list-style-type: none"> ▪ Indistinct problem-solving skills
<ul style="list-style-type: none"> ▪ Unclear goals, roles, & responsibilities 	<ul style="list-style-type: none"> ▪ “Unsafe” attitude for critical task
<ul style="list-style-type: none"> ▪ Lack of or unclear standards 	<ul style="list-style-type: none"> ▪ Illness / Fatigue
Work Environment	Human Nature
<ul style="list-style-type: none"> ▪ Distractions / Interruptions 	<ul style="list-style-type: none"> ▪ Stress (limits attention)
<ul style="list-style-type: none"> ▪ Changes / Departures from routine 	<ul style="list-style-type: none"> ▪ Habit patterns
<ul style="list-style-type: none"> ▪ Confusing displays or controls 	<ul style="list-style-type: none"> ▪ Assumptions (inaccurate mental picture)
<ul style="list-style-type: none"> ▪ Workarounds / OOS instruments 	<ul style="list-style-type: none"> ▪ Complacency / Overconfidence
<ul style="list-style-type: none"> ▪ Hidden system response 	<ul style="list-style-type: none"> ▪ Mindset (“tuned” to see)
<ul style="list-style-type: none"> ▪ Unexpected equipment conditions 	<ul style="list-style-type: none"> ▪ Inaccurate risk perception (Pollyanna)
<ul style="list-style-type: none"> ▪ Lack of alternative indication 	<ul style="list-style-type: none"> ▪ Mental shortcuts (biases)
<ul style="list-style-type: none"> ▪ Personality conflicts 	<ul style="list-style-type: none"> ▪ Limited short-term memory



Performance Modes





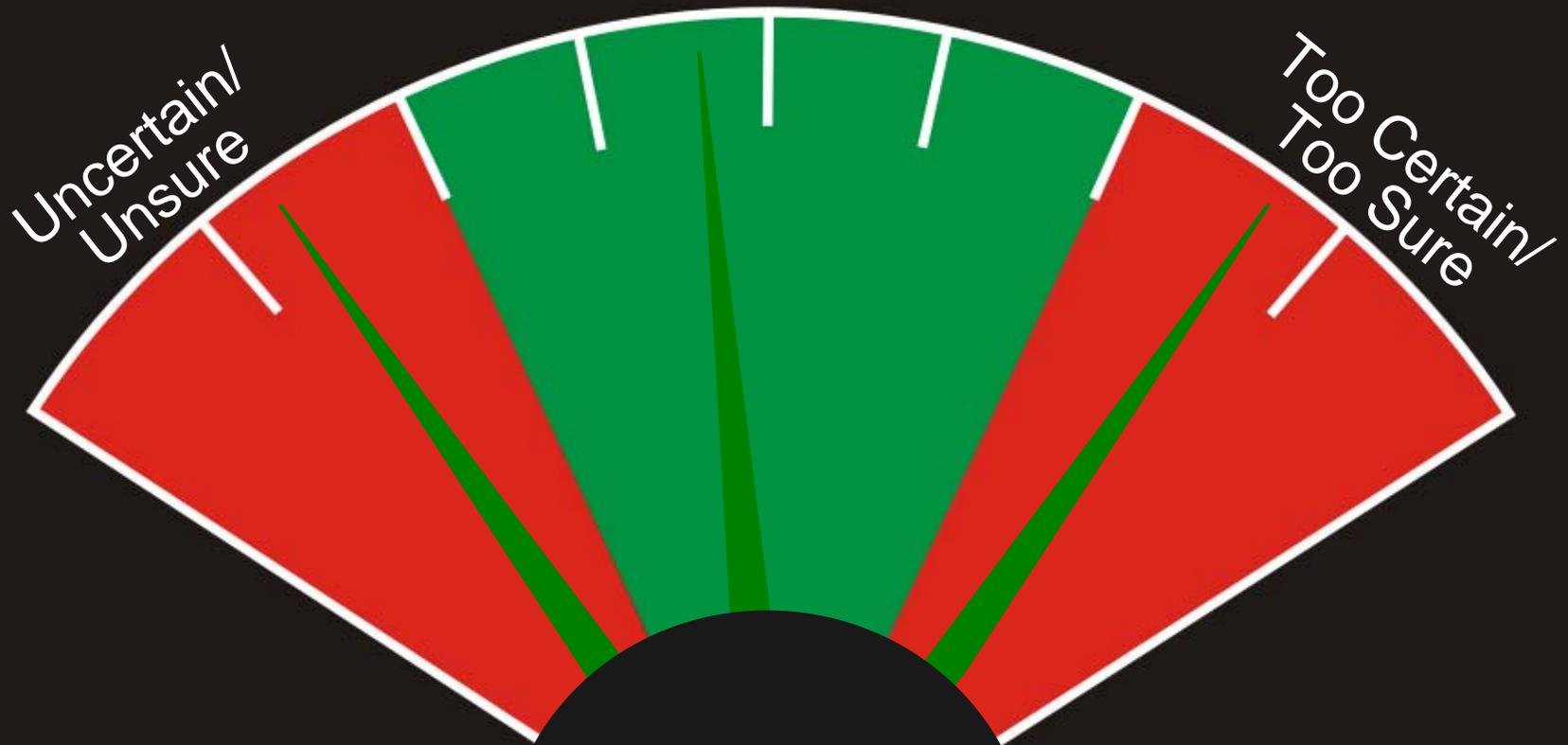
Error-reduction Techniques



- ✓ Conservative decision-making
- ✓ Change management
- ✓ Three-way communication
- ✓ Concurrent verification
- ✓ Independent verification
- ✓ Meetings
- ✓ Peer-checking
- ✓ Placekeeping
- ✓ Prejob Briefing
- ✓ Problem-solving
- ✓ Procedure use & adherence
- ✓ Questioning attitude
- ✓ Self-checking
- ✓ Stop & collaborate
- ✓ Two minute walkdown

Questioning Attitude Meter

Healthy Uneasiness/
Wariness/Alertness





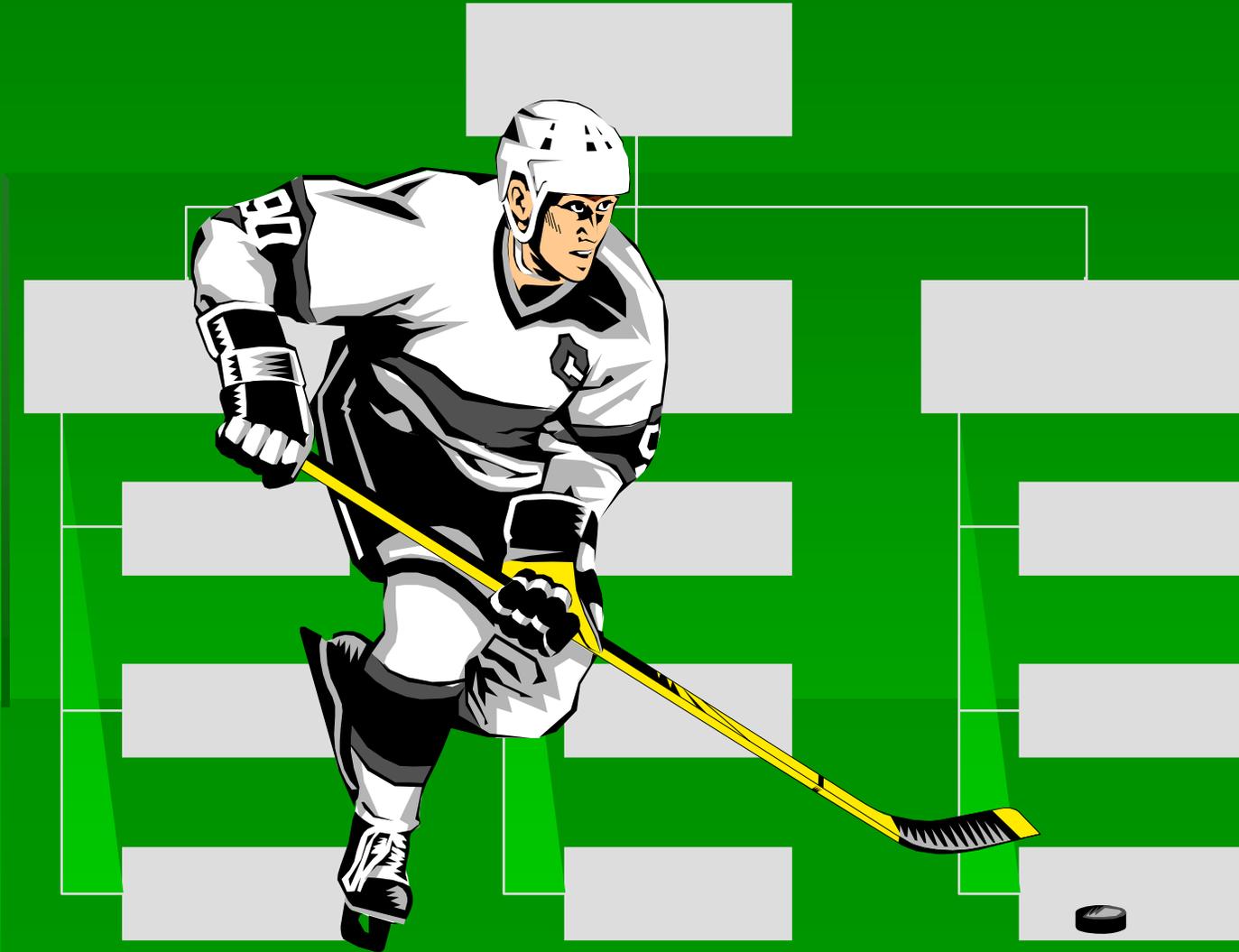
Team Errors



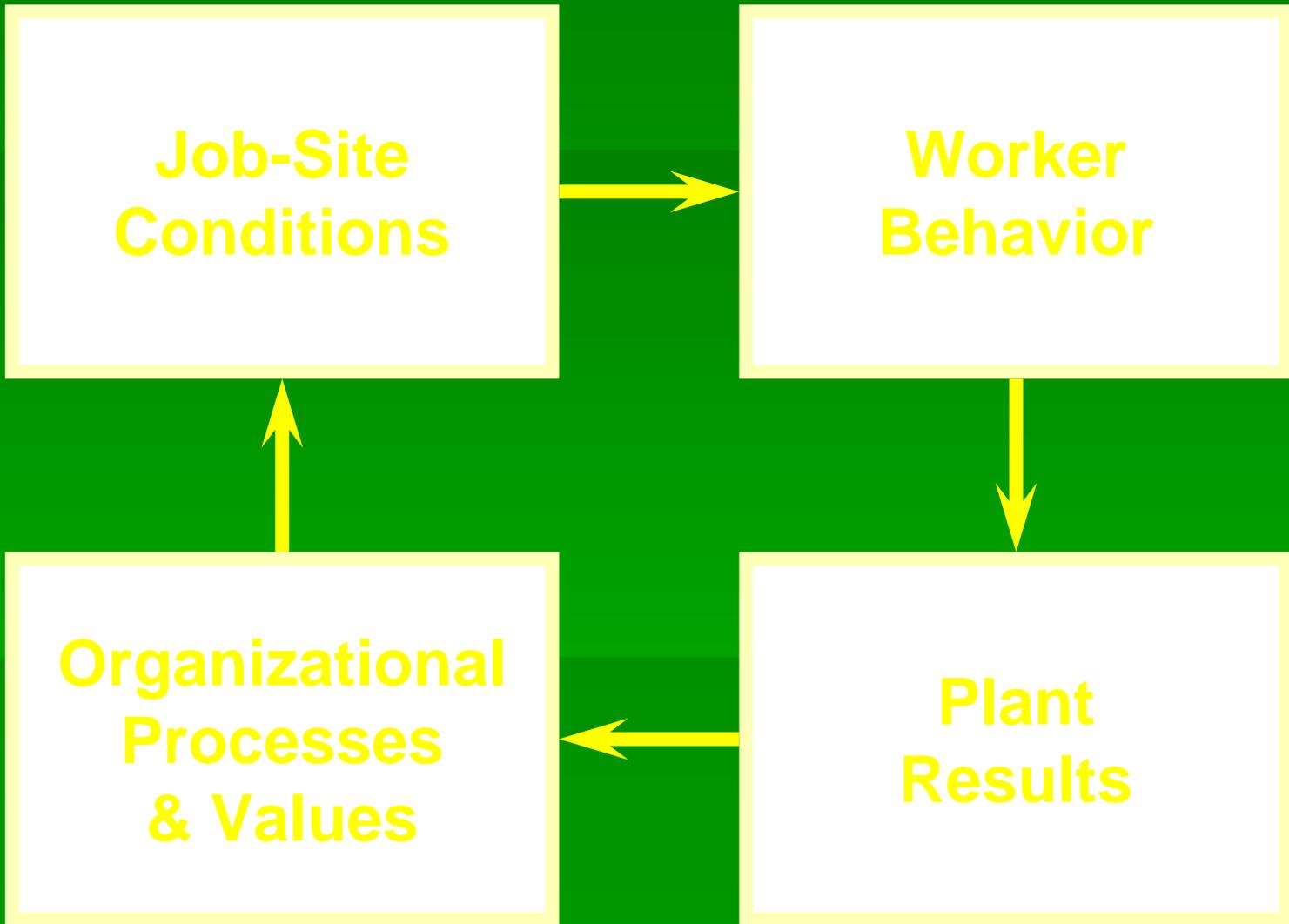
- ❖ Social Loafing
- ❖ Halo Effect
- ❖ Pilot / Co-pilot
- ❖ Free Riding
- ❖ Groupthink
- ❖ Risky Shift



Organization



The Performance Model





WHEN GOOD PETS

GO BAD



Dual Purposes



To consistently search for and eliminate conditions that provoke human error while reinforcing defenses.

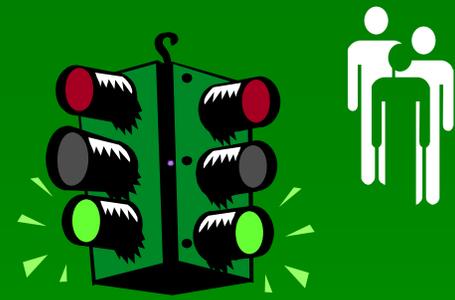
To facilitate the accomplishment of the organization's mission in accordance with its norms, values, and strategies.

Ion Production



Defenses

Flawed defenses allow active errors or their consequences to occur.



Functions:

- ❖ Create Awareness
- ❖ Detect and Warn
- ❖ Protect
- ❖ Recover
- ❖ Contain
- ❖ Enable Escape

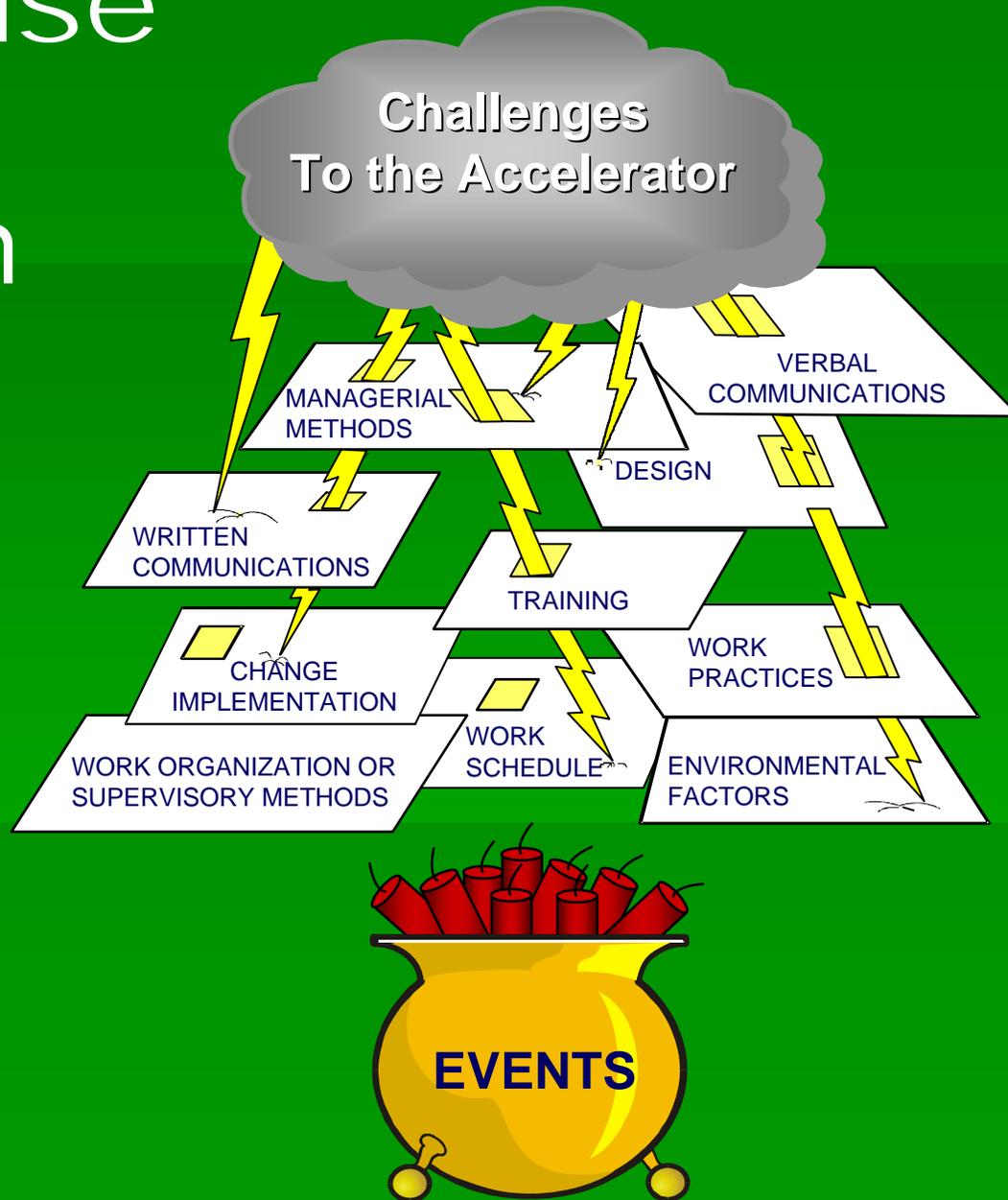
Physical

Administrative





Defense -in- Depth





Latent Organizational Weaknesses (sources)



Processes (structure)

- ❖ Work control
- ❖ Training
- ❖ Accountability policy
- ❖ Reviews & approvals
- ❖ Equipment design
- ❖ Procedure development
- ❖ Human resources

Values (relationships)

- ❖ Priorities
- ❖ Measures & controls
- ❖ Critical incidents
- ❖ Coaching & teamwork
- ❖ Rewards & sanctions
- ❖ Reinforcement
- ❖ Promotions & terminations

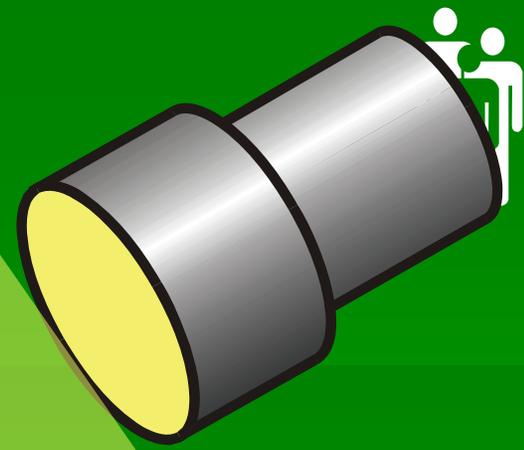
Finding Latent Organizational Weaknesses



- ❖ Self-Assessments
- ❖ Benchmarking
- ❖ Post-job Critiques
- ❖ Trending
- ❖ Surveys and Questionnaires
- ❖ Observations
- ❖ Root Cause Analysis



Leadership

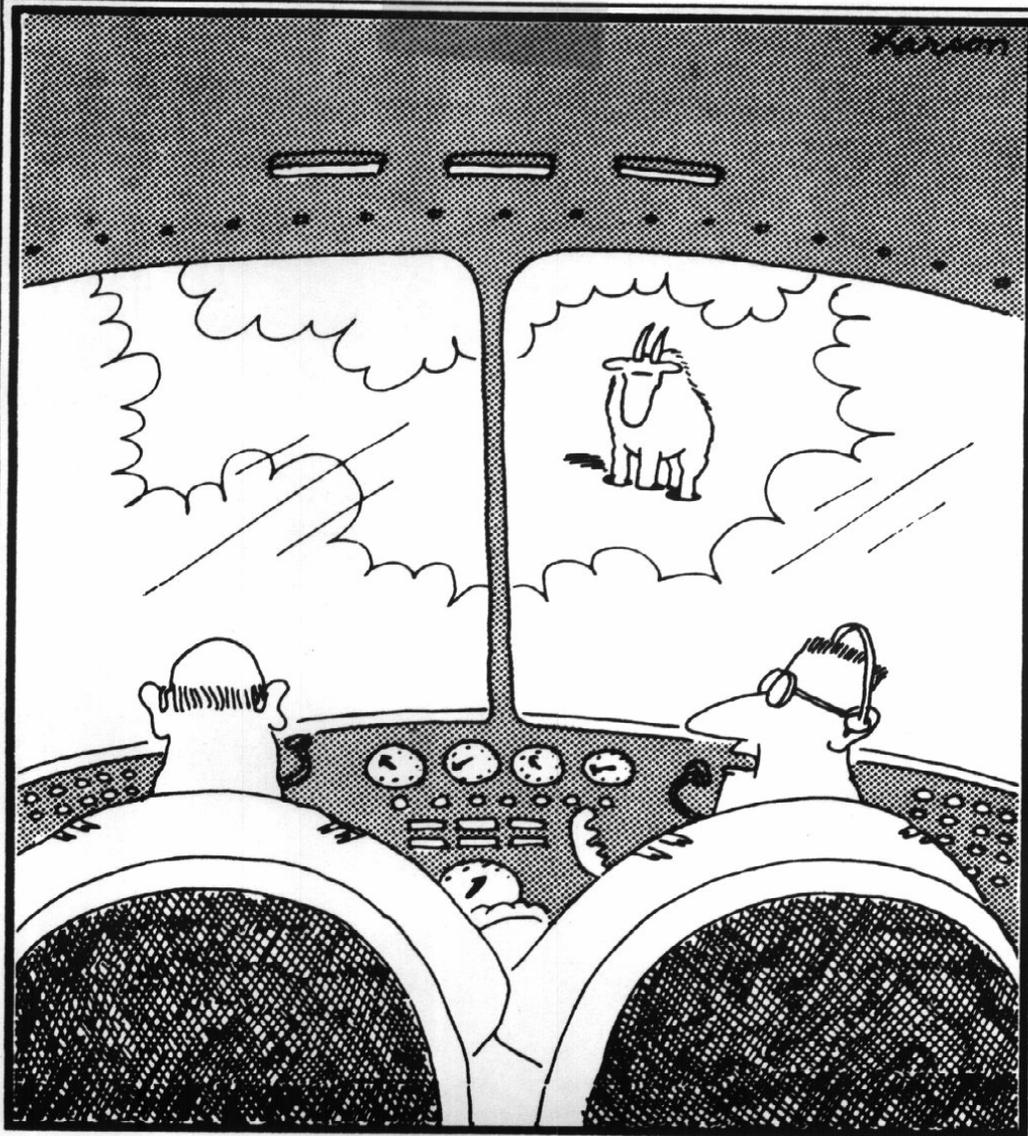




Leadership Practices



1. Facilitate open communication
2. Promote teamwork
3. Reinforce desired behaviors
4. Eliminate latent organizational weaknesses
5. Value prevention of errors



"Say . . . What's a mountain goat doing way up here in a cloud bank?"

Task Preview



Guidance for Level of Pre-job Briefing



	Low-Risk	High-Risk
Simple or Repetitive	SAFER Dialogue	Preplanned Prejob Briefing Forms Plus SAFER
Complex or Infrequent	Generic Prejob Briefing Checklist Plus SAFER	Infrequently Performed Test or Evolution Plus SAFER

Post-Job Critique



1. Purpose: Organizational Improvement
 2. Quick and easy
 3. Production and Prevention
 4. Management acknowledgement
 5. Follow-through
- 